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AUTUMN PLANTS.

BY SOPHIA ARMITT.

HOW to make a choice of autumn plants when there are so many! The lanes are bright with golden-rod and rag-wort, while harebells and sheep's-bit give rich contrasting colour. On the moor the gorgeous tints of heather are waxing redder and duller, but there are still plenty of unwithered spikes and clusters of ling, and the "blushing maiden," that flowers all the summer through. Round the boggy pools, Grass of Parnassus stars are thick-set and white; on what appeared to be one root, I counted 26 open flowers; sometimes one sees a large white spider, the exact colour of the flower, inside it: at the slightest touch to any part of the plant the spider drops and vanishes. A month ago the field gentian studded the upland pastures; most of it is now over, yet standing erect, mere yellow, empty, skeleton plant form; here and there is a patch that is later than the rest, with leaves that are green and living, and the purple petals that need the sunshine to expand them, closing again with the slightest shade. The cottage porches are wreathed up in the great bindweed, with its large white flowers always open, even during rain. Some summer flowers are having a second season this sunny, dry September. There are long hedgerows of fragrant honeysuckle in flower, and not in berry, as one would suppose. Did the hawkmoths not come to get honey from the long tubes this year, as I see no fruit anywhere? Yellow Welsh poppies are past and gone, the bullfinches have emptied their capsules of seed, having made meals of them for many days; they looked splendid, a family of five hanging on to the rigid stems and taking the tiny seeds one by one. The hedge-sparrows frequented the spot after that and diligently picked up the same seed that lay scattered on the ground—seed perfectly invisible in that position to the best human eyes. This caused a counting of those tiny seeds, and each capsule was found to contain from 800 to 1,000 seeds: each plant bears many capsules.

The great celandine is still blooming, Corydalis lutea likewise. On the roadside (Lepidium Smithi) hairy pepperwort is the most abundant crucifer, the lower part of its stems as thick with pods as the top with flowers. St. John's wort (H. Perforatum) flowers on; Tutsan (H. Androsæmum) is at its best, yellow flowers and berries reddening on the same cyme, with gorgeous leaves about and beneath. Lathyrus Pratensis has flowers on one branch and black pods on another. Angelica sylvestris is the Umbellifer of this month especially, while the Composites are innumerable. Ivy is abundantly preparing its buds, mere little knobs at present. I have been noting some common flowers that have two stages of life, first male and then female, and how the essential organs get themselves into two positions to represent these conditions. In them all the male or pollen-bearing stage is the first and often the briefest; the anthers open sometimes in bud, and whether the pollen is carried by them or lifted into the air by the brush of the pistil, its dispersal takes place rapidly. After this the pistil grows on to its own maturity and the expansion of its stigma, and the second stage of the flower drags on lengthily and indefinitely. It is often necessary to examine many flowers to get one in its first or male stage.

The two Scabiosas are much in evidence just now; the large pale mauve heads of Scabiosa arvensis are still abundant here and there, though their best time is over. They are rich in honey, and so beloved of the bees and other insects. On a group of these flowers one August day I saw together two sorts of butterflies and five species of humble-bees. There are about 50 florets in hemispherical heads, which go through the two stages of their life's work simultaneously. The stamens are curled up in bud; they straighten themselves when the flower opens, not together, but one by one, and turn their pollen-covered surfaces upwards. This happens slowly; the outer florets opening first and the innermost ones last; but all the flowers go through this (the male) stage before any of the styles elongate or the stigmas mature. There is plenty of honey at the base of the open tubes, the pollen is attractive also, the anthers being generally removed entirely. When the pollen is gone from the last of the anthers in the central florets the growth of the styles begins, till they stand up above the heads as did the anthers before them. The whole of the florets are then in the second stage together, and the visit of a pollen-dusted bee from a younger flower might fertilize the fifty in the few minutes which it will take to laboriously sip of the nectar from the fifty open cups that hold it.

Scabiosa Succisæ (devil's-bit) is very abundant in rather unproductive places; its smaller purple heads attract, too, the humble-bees; one hears them all about where many of these plants are. Like S. arvensis, here too, the bent-in stamens straighten themselves out one by one, and stand erect; only when the anthers are withered and gone do the styles grow higher and the stigmas become viscid. Here and there grows a white instead of a purple head. In the heads of Yarrow (Achillea Millefolium) it is different; there are flowers in both stages at the same time. The pistil carries the pollen out of the anther tube and rises a club-shaped mass of yellow dust; when the pollen is dispersed the style-arms open and the stigmatic surface is disclosed inside: they curl backwards to expose it freely. In the Campanulaceæ it is difficult to come upon the moment of the opening of the anthers—in all the buds they are still closed up, in all the flowers they are over and shrivelled. As the flowers open, the anthers do so likewise; they form a hollow cylinder round the hairy style and, opening inwardly, the pollen adheres to the style brush. The stamens themselves then rapidly wither and fall to the base of the flower, the brush on the pistil carrying the pollen until it is removed, and this stage is reached before the flower is fully open; the bees visit the flower and remove the pollen, the hairs of the brush shrivel slowly. Later still, the three parts of the style separate and curve backwards, displaying inner surfaces covered with stigmatic papillæ. Jasione montana is a member of the Campanula family that has gathered its flowers, seventy to a hundred of them, into a head after the manner of the Compositæ; the corolla is split down to the base into five strap-shaped lobes; the stamens are united into a ring at the base of the anthers. The anthers open in bud and the pistil brush carries up the pollen. There is plenty of honey, and insect visitors abound; the pollen vanishes, the hairs shrivel, and, last of all, the two-lobed stigma is displayed standing up above the petals; the larger insects fertilise many florets at once.

The Ericaceæ have anthers with little tails, sharp divergent points, which stand out around them on every side, inevitably in the way of the proboscis that would suck the honey from the dark glands around the base of the pistil. A touch to one of these little tails brings out a shower of dusty pollen from the holes in the anthers that stand in a circle round the style, on the head of the honey-sucker. As the flower bud opens so do the anthers, and in the heather it is only after they have quite shed their pollen that the style develops to its full length and the four-lobed sticky stigma matures. The position of this stigma in the mouth of the flowers in Ericas, or much in front of the anthers in Calluna, would ensure cross-fertilisation even without the difference in time between the maturity of the two organs. Gentiana campestris is the one autumn flower I have found that appears to have its pollen and its stigma mature together; the fringe round the mouth of the corolla protects the flower from creeping insects, and the entrance is narrowed that the humble-bees may effect cross-fertilisation by inserting their proboscides; yet self-fertilisation seems not impossible, but rather probable. Müller says that these flowers are not always thus homogamous, but sometimes slightly proterogynous, when the stigma being ready before the pollen would ensure crossing. In the flower of Redrattle (Odontites scrotina) at first the style lies behind the stamens in the shallow hood; the anthers are held together with hairs, and a touch causes a fall of pollen on to the insect that touches. Later, the style grows longer and bends over, bearing its mature stigma. The development of these flowers, however, seems to vary with their situation in a sunny or a shady place. Müller says that the style protrudes from the bud, but it is not so in the flowers here. My last instance is a Labiate (Wood Sage), a remarkably proberandrous flower. First, the style stands behind the stamens, which are erect in front of it; when they have lost the pollen they slowly bend back, removing themselves out of the way, while the style comes forward into the position occupied first by the lower anthers.